

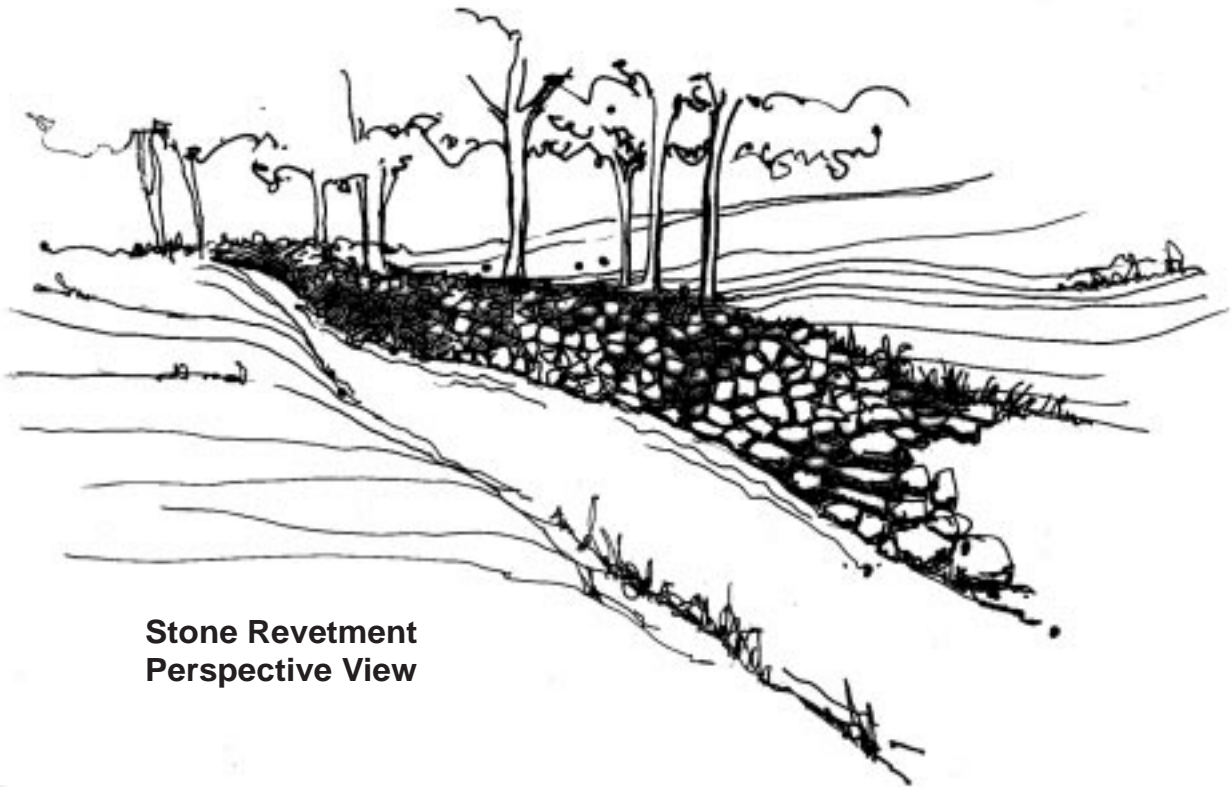
PRIMARY USE: Erosion control.

ADDITIONAL USES: Reduced sediment in receiving waters.

STONE REVETMENT

What is it? A revetment is a facing of stone placed on a bank or bluff to protect a slope, embankment, or shore structure against erosion by wave action or currents. Also known as Riprap Revetment.

Purpose To prevent erosion of banks.



**Stone Revetment
Perspective View**

Limitations The cost of labor or machinery necessary for slope preparation or placement of the largest sizes of stone may be high even where material is available at reasonable cost.

Materials Stones, filter fabric, some structural materials.

Installation Where they are readily available, rubble or quarystone make the most reliable and economical revetments. Adequate filters and armor stone size are important.

Source: Low Cost Shore Protection, Army Corps of Engineers.

STONE REVETMENT

Design Considerations and Drawings:

Waves break on revetments as they would on an unprotected bank or bluff, and water runs up the slope. The extent of runup can be reduced by using stone or other irregular or rough-surfaced construction materials. A rough surface offers more resistance to the water's flow than the original shoreline surface, decreasing the energy of the wave more quickly and preventing the water from traveling as far.

Important design considerations include providing appropriate height, width, and toe protection. Revetments should be high enough to prevent overtopping by high waves. To prevent flank erosion, the sides should be protected by tiebacks or returns. Scour at the toe can be prevented by a rock apron. Where there is a beach between the revetment and the water, access over the structure should be provided for beach users.

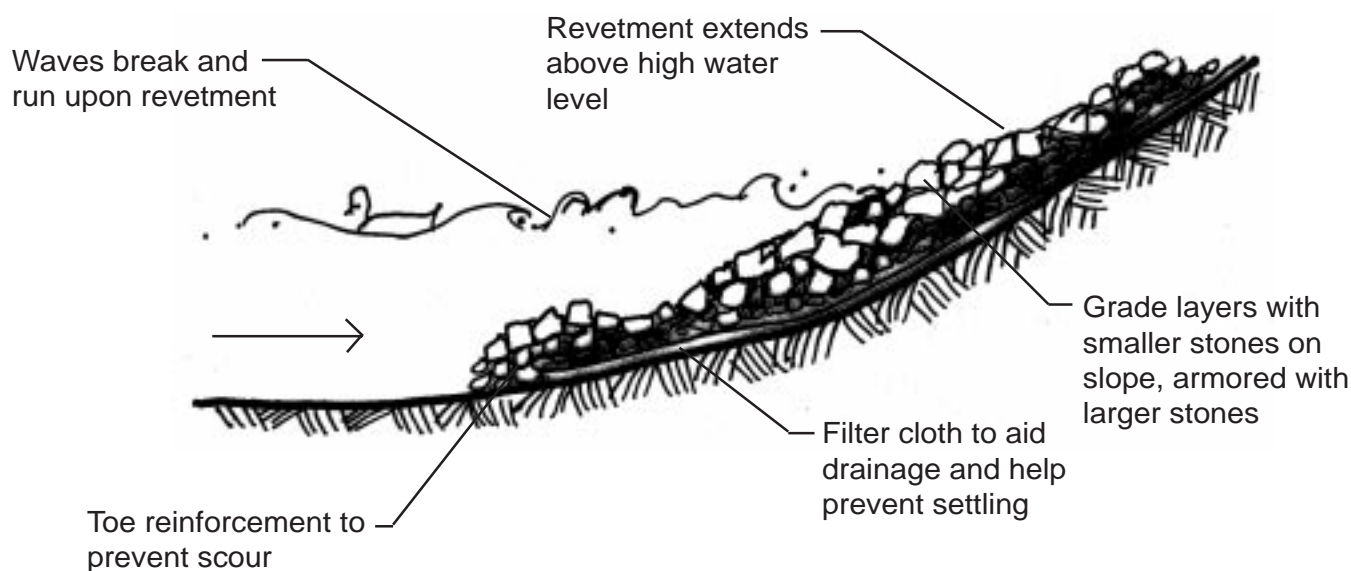
Revetment design should also allow for relief of groundwater pressure in the protected bank. Filters of cloth or small stones relieve water pressure in porous revetments, keeping drainage paths open and preventing settling. Solid revetments can be drained by evenly spaced "weep holes" along the bottom. This drainage channels the groundwater along noneroding paths and prevents it from seeking its own way along the softer material of the slope.

Revetments that are adequate under normal conditions may be damaged in severe storms, when the speed of water and carrying power of waves increase to several times their normal rates. Thus, revetments must be strong enough to resist the battering action of waves and wave-carried debris. Heavy stones and an interlocking design in porous revetments can help prevent the construction material from being washed away.

Revetments can be adapted to a variety of local conditions and available materials. Some materials are more suitable to gentle slopes and light wave action, others are more sturdy. Armoring the revetment with a heavy face layer and providing drainage are key elements of success.

Revetments are stable if they are built on relatively gentle slopes, with two to four feet of run for every foot of rise. Revetments should not be built on slopes with less than a foot and a half of run per foot of rise. The slope on which a revetment is to be built may require grading or smoothing to prepare an adequate foundation for construction.

Erosion at the toe, common in steep revetments, further decreases the stability of the structure. In areas where unstable slope materials may displace the structure, other shoreline erosion devices should be considered. Where vandalism is likely to be a problem, especially heavy or durable construction elements are needed.



**Stone Revetment
Section View**